Memo

To:	CCB
From:	Mark Fisk, Xiaoping Yang, Rick Carlson, and Relu Burlacu
Date:	December 22, 1999
Subject:	Gamma Bulletin Capability for the PIDC Web Site
Sponsor:	Bob North
CC:	

Abstract

This proposal introduces the use of the *LiveWire* interface, included in the Netscape Enterprise Server, to access the Oracle database for generating the Supplementary (Gamma) bulletins on the PIDC Web site.

The Gamma (GAMMA) Bulletin contains supplementary event information since the beginning of the GSETT-3 experiment in January 1995. These events are located by national networks and contributed to the PIDC by the National Data Centers. About 30 NDCs have provided events to the Gamma Bulletin. While some NDCs contributed only once or twice, most of these NDCs have been sending their bulletins to the PIDC regularly.

The proposed changes are expected to: (1) make the GAMMA events available to the interested users; (2) maintain a similar mechanism for generating on-line bulletins (see Carlson et al., 1999).

Statement of Objective

The objective is to provide a reliable and maintainable mechanism for generating the GAMMA bulletins on the PIDC Web site, using a *LiveWire* interface to the Oracle database.

Summary of Proposed Change

Netscape Enterprise Server version 3.5.1 (NES) contains the *LiveWire* extension, which allows development and use of server-side javascript (ssjs) applications with direct Oracle database access (Carlson et al., 1999). NES supports JavaScript version 1.2. The proposed change consists of promoting a set of *LiveWire* applications, and associated ssjs and Perl support scripts, to operations, to handle the GAMMA bulletin retrieval functions for the PIDC Web site. *GSEBull* will be used to access the bulletin data, in an on-demand mode. The on-line GAMMA bulletins will be produced in GSE2.0 format.

All geographic maps included with the event list and GAMMA bulletin web pages will have political boundaries as a display option. The political boundary data are extracted from GMT version 3.1, November 1998, and will be updated as new versions become available.

It is proposed that: (1) Perl support scripts and ssjs executables be installed in /web/web-bin; (2) the new *LiveWire* source applications be installed in /web/LW/ssjs/gamma; (3) the subdirectories /web/LW/cache, /web/LW/data/par, /web/LW/data/maps will be populated with supporting parameter and data files. All new directories and files are to be installed on Webster. Tables 1 through 4 summarize the specific proposed changes.

Table 1: Changes to /web/web-bin and /web/web-bin/lw

file	version	change	description
bullcal.pl	4.2	Update	Perl script - calendar retrieval
gamma.web	4.1	Add	ssjs executable
event_list_gam.pl	4.1	Add	Perl script - GAMMA event list
event_title_gam.pl	4.1	Add	Perl script - GAMMA event page title
makemap_gam.cgi	4.1	Add	Perl script - clickable map routine
map_table_gam.pl	4.1	Add	Perl script - map feature frame routine
map_table_driver_gam.pl	4.1	Add	Perl script - map high-level driver
mkbuls_gam.pl	4.1	Add	Perl script - web/*GSEBull* interface

Table 2: Changes to /web/LW/ssjs/gamma

file	version	change	description
dbgamcount.html	4.1	Add	ssjs - GAMMA custom page
dbgamcustom.html	4.1	Add	ssjs - GAMMA custom page
dbgamevent.html	4.1	Add	ssjs - GAMMA event page
dbgamma.html	4.1	Add	ssjs - GAMMA bulletin page
function.js	4.1	Add	ssjs - support function library
build	4.1	Add	script to build *gamma.web* executable

Table 3: Changes to /web/LW/data/par

file	version	change	description
GSEBull.par	4.2	Updated	data file - *GSEBull* parameters

Table 4: Changes to /web/LW/data/maps

file	version	change	description
map_init.gamma.dat	4.1	Add	data file - GAMMA bulletin map initialization
map_init.gamevent.dat	4.1	Add	data file - GAMMA event map initialization

Expected Benefits

There are several significant benefits resulting from the proposed changes.

First, events from the GAMMA database will be available for the interested users. The GAMMA events can be accesses using the calendar tool or a form for customized queries. The calendar tool is part of the GAMMA bulletin web page (Figure 1). Selecting a day from the calendar a new web page is displayed, driven by dbgamma.html. This page is generated dynamically, based on the user selection. The results for 10/01/1999 are presented in Figure 2 and Figure 3. The map with the events is presented in Figure 2 and the list of events is shown in the right corner of Figure 3 (the map and the list are part of the same web page). The selection of a particular event from the list (in our case event at 11:08:12.3) or from the map generates a new web page (event page), driven by dbgamevent.html, presented in the left side of Figure 3. A map and *GSEBull* output are part of this page. The user can also use a form for customized queries, shown in Figure 4.

Second, the presence of GAMMA events on the web could motivate the NDCs to participate with their GAMMA information to the PIDC.

Third, the GAMMA bulletin pages are generated with a mechanism similar to the other bulletins. This assures consistency and makes these pages easier to maintain.

Summary of Testing

Testing has been performed on the development version. This version is currently accessible using the following URL: *http://www.pidc.org/web-bin/bullcal_new.pl?bull=GAMMA&out=html.*

All options have been thoroughly checked and compared against the GAMMA database. All map functions, including the optional overlays of political boundaries, historical REB data, and magnitude circles, have also been tested and verified.

Possible Risks and Dependencies

The number of hits on the Oracle database (alfheim) will increase, but our experience with other bulletins shows that the database load is acceptable. There is no risk to the ops database (alsvid).

Schedule and Plan for Implementation

The steps to implement the proposed changes are:

- Install Perl support scripts and ssjs executables in /web/web-bin on Webster;

- Install *LiveWire* source applications in /web/LW/ssjs/gamma on Webster;

- Install/Update support data files in /web/LW/data/maps and /web/LW/data/par on Webster;

- Insert the link to the GAMMA database web page on the Data Products page;

Pending CCB approval, these installation tasks are planned to be performed on 22 December 1999.

Costs and Resources Required for Implementation

Implementation of the proposed changes is estimated to require approximately one day of labor, to be performed by Relu Burlacu. No other costs or resources are required.

References

Carlson, R., R. Burlacu, and M. Fisk (1999). *Livewire Bulletin Capability for the PIDC Web Site,* CMR-PRO-99/05.

Comprehensive Nuclear Test-Ban Treaty

Prototype International Data Centre

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Supplementary (GAMMA) Bulletin Retrieval

GAMMA Bulletin Retrieval in GSE2.0 file format
GAMMA Bulletin Retrieval in GSE2.0 Compressed file format

The Supplementary (also known as Gamma) Bulletin contains supplementary event information since the beginning of the GSETT – 3 experiment in January 1995. These events are located by national networks and contributed to the PIDC by the National Data Centers. About 30 NDCs have provided events to the Gamma Bulletin. While some NDCs contributed only once or twice, most of these NDCs have been sending their bulletins to the PIDC regularly. The NDCs may send their automatic locations first, then followed by the analyst reviewed results.

The GAMMA Bulletin represents an invaluable source of well – located events that may be accepted as ground truth events. Comparisons between the GAMMA Bulletin and the REB for common events can reveal systematic biases in the IMS network solutions and lead to concentrated regional calibration effort. However, the quality of the GAMMA Bulletin varies from region to region. Many NDCs provide locations far outside their territory. Very often the events are provided without quality information so that it is impossible to assess the accuracy of the event parameters. We strongly encourage more national networks to provide their bulletins, particularly accompanied by the quality information (e.g. number of stations and defining phases, minimum/maximum distance between stations and event, azimuthal gaps, and errors). Multiple solutions for the same event from different networks are welcome.

As distinct from the Calibration Event Bulletin, there are no arrival picks (nor regional waveforms) in the GAMMA Bulletin. Therefore no re–locations are attempted at the PIDC for the events in the GAMMA Bulletin. Furthermore we do not judge the multiple solutions to an event nor choose a preferred origin for an event. PIDC arrival and waveform data are available for a GAMMA event when it is also in the REB.

The GAMMA Bulletin is stored in an Oracle database. All data submission is by Email in GSE2.0 format. An automatic parser at the PIDC loads the bulletins into the database upon arrival. If the REB covering the same time period is available at the time of loading, the Gamma events are compared against the REB for event correlations. The REB event id (evid) is used for a Gamma event if it is also in the REB (origin time within 60 seconds and epicenter within 3 degrees), or a new event id is assigned otherwise. Events do not get ids assigned (default to – 1) if the REB is not available for comparisons at the time of loading. In this case the event ids are reprocessed at next loading time. Events are also grouped across the NDCs even if the events are not in the REB. As of December 1999 there are 133,311 processed events in the database, of which 27,480 (~20%) match events in the REB. There are 347 events to be processed for comparisons with the REB.

To select events from the Gamma Bulletin, please use the Calendar Retrieval presented below, or Custom Retrieval. Note that events may be absent in some of the recent days, so "No Events" will be shown if such days are selected.

November 99

Su	Mo	Tu	We	Th	Fr	Sa	
	1	2	3	4	5	6	wk45
7	8	9	10	11	12	13	wk46
14	15	16	17	18	19	20	wk47
21	22	23	24				

October 99

Su	Mo	Tu	We	Th	Fr	Sa	
					1	2	wk40
3	4	5	6	7	8	9	wk41
10	11	12	13	14	15	16	wk42
17	18	19	20	21	22	23	wk43
24	25	26	27	28	29	30	wk44
31							

September 99

Su	Mo	Tu	We	Th	Fr	Sa	
			1	2	3	4	wk36
5	6	7	8	9	10	11	wk37
12	13	14	15	16	17	18	wk38
19	20	21	22	23	24	25	wk39
26	27	28	29	30			

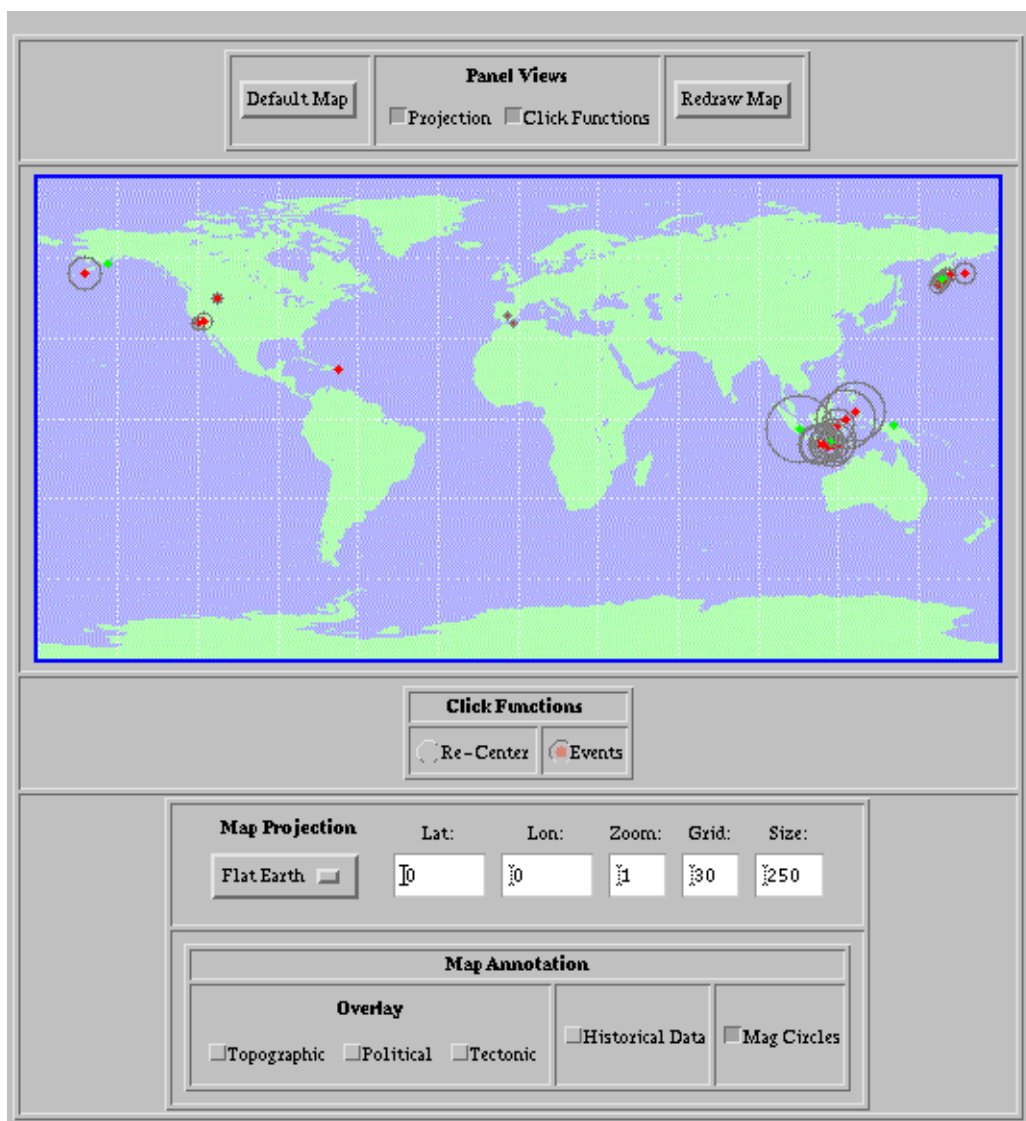Figure 1. Main web page for the GAMMA Bulletin access

Figure 2. World map and the GAMMA events for 10/01/1999

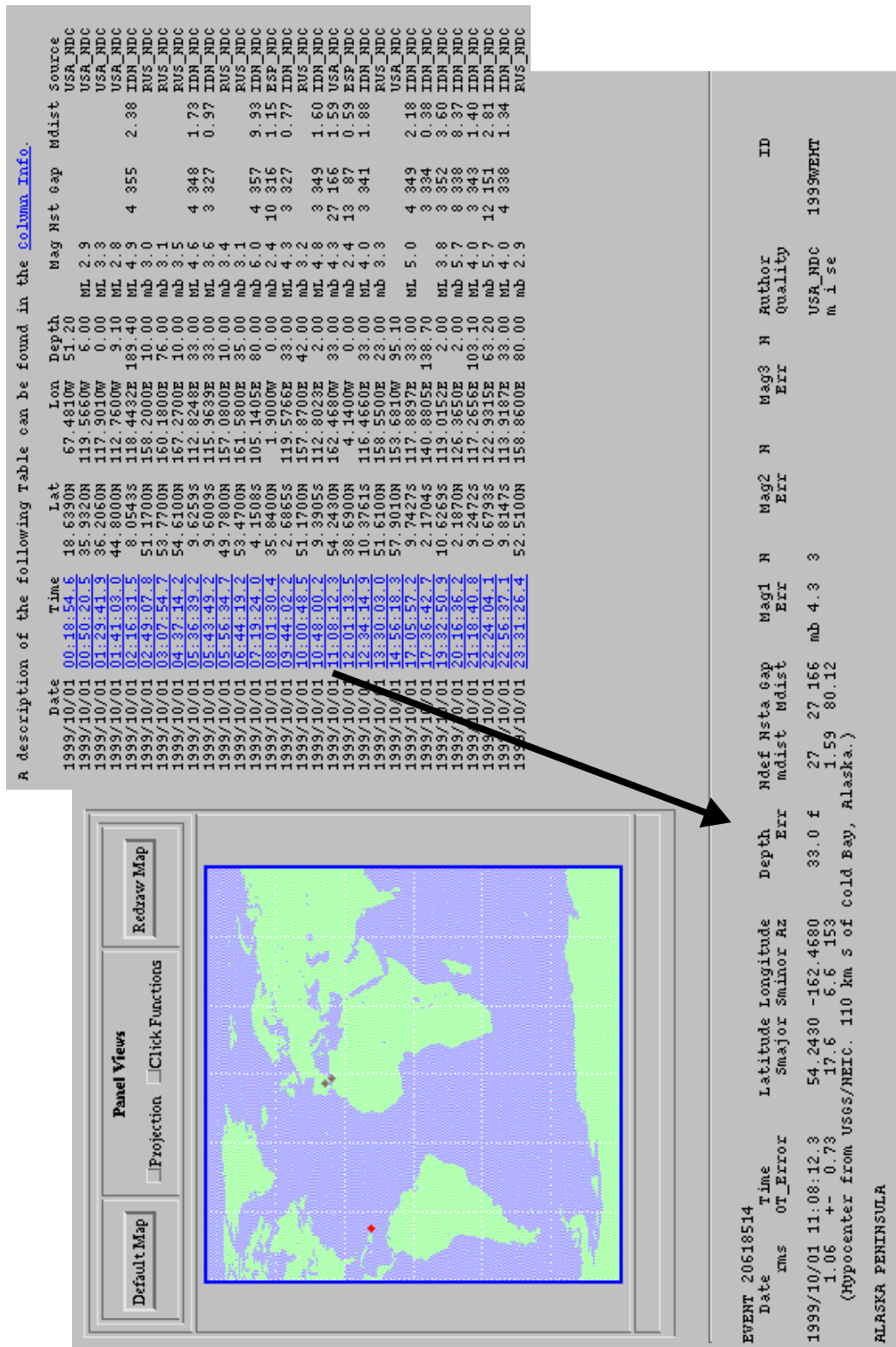Figure 3. List of GAMMA events for 10/01/1999 and the event page for the event at 11:08:12.3

Figure 4. Custom GAMMA bulletin retrieval form